

- 3 (a) a polarizer layer;
4 (b) an analyzer layer;
5 (c) a liquid crystal layer disposed between the polarizer layer and the analyzer layer;
6 (d) a first electrode proximate to a first major surface of the liquid crystal layer;
7 (e) a second electrode proximate to a second major surface of the liquid crystal layer,
8 the first and second electrodes being adapted to apply a voltage across the liquid
9 crystal layer when the electrodes are connected to a source of electrical potential;
10 and
11 (f) a compensator in accordance with a specified one of claims [100, 110, etc.] 1, 3,
12 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, or 15, disposed between the polarizer layer and the
13 analyzer layer.

23
Canceled

REMARKS

Claims 1, 3 through 9, 11 through 15, 23, and 24 are currently pending in this application. Claims 16 through 22 are subject to restriction.) Claims 2 and 10 has been canceled without prejudice to their underlying subject matter. Claims 9 through 11 have been objected to. Amendments to claims 1, 3 through 9, 11, 13, 14, and 23 are presented above. Reconsideration of the pending claims in light of the above amendments and the following remarks is requested.

Remarks Concerning Claim Amendments

Claim 2, originally directed to a generic embodiment of the invention, has been canceled without prejudice. Dependent claims 5, 6, and 7 have been amended to specify, in independent form, a general embodiment of each of three compensator structures in accordance with the invention: (1) claim 5 is directed to a compensator for a liquid crystal display having a varying azimuthal twist angle and a substantially fixed tilt angle; (2) claim 6 is directed to a compensator having a substantially fixed azimuthal twist angle and a varying tilt angle; and (3) claim 7 is directed to a compensator having a varying azimuthal twist angle and a varying tilt angle.

Support for these amendments may be found in the specification. For example, see page 19, lines 11-12; Sections 5.1 through 5.3, page 23, line 1, to page 29, line 12, and Figs. 11-13.

Remarks Concerning 35 U.S.C. § 112, ¶ 1, Rejection

Claim 13 was rejected under 35 U.S.C. § 112, ¶ 1, as allegedly being unsupported by the specification. The Examiner's reasoning for this rejection is not clearly understood.

First, the Examiner is believed to be correct when he asserts that "[t]he disclosure does not describe tilt angles nor azimuthal angles in the alignment layers." (In the Office Action see page 3.) It is believed, however, those of ordinary skill in the field of liquid crystal display design would know that an alignment layer, such as polyimide, does not itself have a meaningful optical symmetry axis but rather produces a pretilt angle and an azimuthal angle in a liquid crystal material in contact with the alignment layer. (See, for example, in the specification page 24, lines 13-17.)

Furthermore, an embodiment in accordance with claim 13 is clearly described in the specification at Section 5.4 entitled "Multilayer Embodiment." (In the specification see page 29, line 16, to page 31, line 17.) In particular, in this embodiment it is taught that "[e]ach successive layer is deposited over the preceding layer after the preceding layer has been cured with UV radiation. Each succeeding layer can be azimuthally aligned and pretilted at the interface by the preceding layer." (See in the specification, page 31, lines 8-10.) Thus, claim 13 is directed to a compensator whose liquid crystal material layers align one another without the use of an interposed alignment layer material such as polyimide.

In light of the above remarks and amendments, the Assignee submits that the alleged section 112, ¶ 1, rejection of claim 13 has been overcome and respectfully requests this rejection be withdrawn.

Remarks Concerning 35 U.S.C. § 112, ¶ 2, Rejections

Claims 23 and 24 were rejected under 35 U.S.C. § 112, ¶ 2, for allegedly failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular, the Examiner asserts that “[c]laim 23 is indefinite since it depends upon claims which do not exist ... Claim 24 is rejected because it depends from claim 23.” (In the Office Action see pages 3-4.)

In light of the above amendment to claim 23, the Assignee submits that the alleged section 112, second paragraph, rejections have been overcome and respectfully requests these rejections be withdrawn.

Remarks Concerning 35 U.S.C. § 102(b) Rejections

Claims 2 and 5 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Heynderickx et al. (European Patent 0-423-881). In particular, the Examiner asserts that “Heynderickx et al. teach a compensator 16 for a liquid crystal display device wherein the compensator comprises a layer of birefringent material having an optical symmetry axis and azimuthal angle that vary along an axis normal to the layer.” (In the Office Action see page 4.)

Claim 2 has been canceled without prejudice. Claims 5, 6, and 7 have been amended to specify a compensator layer having (1) a varying azimuthal angle and substantially fixed tilt angle, claim 5; (2) a substantially fixed azimuthal angle and a varying tilt angle, claim 6; and (3) a varying azimuthal angle and a varying tilt angle, claim 7.

"For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677, 7 U.S.P.Q.2d (BNA) 1315, 1317 (Fed. Cir. 1988), quoted in *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d (BNA) 1566 (1990) (vacating and remanding Board holding of anticipation).

Heynderickx et al. is believed to describe a liquid crystal display device with “a double-refracting foil [birefringent film] having a twist and a double-refraction [birefringence] which are equal to the twist and double-refraction [birefringence] of a super-twisted nematic liquid crystal display device.” (In Heynderickx et al. see col. 1, line 53 to col. 2, line 1.) The double-refracting foil, or birefringent film, in Heynderickx et al. comprises a “monomer between two polyimide-coated and rubbed surfaces.” (In Heynderickx et al. see col. 1, line 53 to col. 2, line 1.)

Those of ordinary skill in the art of liquid crystal display design will recognize that a conventional super-twist liquid crystal display has an inherently low, and substantially fixed, tilt angle. As discussed in the attached technical paper, at zero applied voltage (the relevant state) the “tilt angle of the local optic axis in the midplane layer” is substantially constant and fixed for a given twist angle. (In “Liquid Crystal TV Displays: Principles and Applications of Liquid Crystal Displays,” see pages 168-170 and, specifically Figure 5.25 on page 169.) Figure 5.27(a) in this same reference also shows that the tilt angle at the midplane layer of a conventional STN display is typically very low (in Figure 5.27, $\alpha \approx 0^\circ$ = tilt angle). Further, the specification is explicit in its description of a conventional STN compensator structure (double refracting foil) comprising a layer of a birefringent (double-refraction) material disposed between two polyimide-coated and rubbed surfaces. In such a structure, the polyimide alignment layer material produces a liquid crystal pretilt angle of from 1° to 10° . (In the specification see page 24, lines 13-17.)

In contrast, a compensator in accordance with any one of claims 5, 6, and 7 has a birefringent layer whose optical axis (either tilt angle, or azimuthal angle, or both) varies. A further distinction between a compensator in accordance with any of claims 5, 6, and 7 and Heynderickx et al. is that the tilt angle is substantially greater than zero; “between approximately 25 degrees and approximately 65 degrees.” (See amended claim 5.) Specifically, Heynderickx et al. do not appear to discuss any unique feature or aspect of their compensator’s tilt angle; apparently relying on the fact that it is small, typically less than 10 degrees. (In the specification see page 24, lines 14-15.)

In light of the above amendments and remarks, the Assignee submits that the alleged section 102 rejections of claims 2 and 5 (amended claims 5, 6, and 7) have been overcome and respectfully requests these rejections be withdrawn.

Remarks Concerning 35 U.S.C. § 103 Rejections

Rejection over Heynderickx et al. Claims 1, 3, 4, 6, and 7 were rejected under 35 U.S.C. § 103 as allegedly being obvious in view of Heynderickx et al. (European Patent 0-423-881) as applied to claims 2 and 5. In particular, the Examiner asserts that “[a]s to claims 1, 3, and 4, polymerizable nematic material is well known ... it would have been obvious to use nematic materials that are polymerizable and unpolymerized. As to claims 6 and 7, to provide a particular transparency or transmissivity to the compensator plate, it would have been obvious to provide a tilt angle that varies along an axis normal to the layer ... [A]s to claim see the discussion in the rejection of claim 5.” (In the Office Action see page 6.)

Claims 6 and 7 have been amended to independent form and, together with amended claim 5, specify three embodiments of a compensator in accordance with the invention. See discussion above vis à vis the section-102 rejections.

The discussion above regarding the Examiner’s section-102 rejections is believed to point out some of the technically significant differences between a compensator in accordance with any one of independent claims 5, 6, and 7 (and, therefore, dependent claims 3 and 4) and Heynderickx et al. It is further noted that claim 1, as amended, highlights the important feature that a **single** compensator layer in accordance with the invention has a varying optical axis whose tilt angle is “limited to values between approximately 25 degrees and approximately 65 degrees” (see paragraph ‘c’).

Rejection over Heynderickx et al. and Arakawa. Claims 8 and 12 were rejected under 35 U.S.C. § 103 as allegedly being obvious in view of Heynderickx et al. as applied to claims 2 and 5, and further in view of Arakawa (U.S. Patent 5,189,538). In particular, the Examiner asserts that “as to claim 8, it would have been obvious to use a plurality of compensation layers,

as taught by Arakawa, in the device of Heynderickx et al. ... As to claim 12, birefringent layers with a plurality of moieties and alignment layers for aligning the moieties are inherent. As to claims 14 and 15 ... Arakawa teaches that the combination of an A-plate and a C-plate can inhibit retardation affects based on viewing angle." (In the Office Action see page 7.)

Arakawa is believed to describe a compensator device having at least one film. According to Arakawa, "[a]ny film whose optic axis is substantially perpendicular to the surface thereof will suffice for the purpose" of his device. (In Arakawa see col. 3, lines 37-39.) "In short, the concept of the present invention consists in a combined use of film (A) having its optic axis substantially in the normal direction thereof with longitudinally uniaxially stretched film (B)." (In Arakawa see col. 6, lines 37-40.)

It appears that a compensator film, either film (A) or film (B), in accordance with Arakawa (see cited quotes at col. 3, lines 37-39 and col. 6, lines 37-40), has a **fixed** optical axis orientation, although the specific orientation may differ from one compensator layer to another. Arakawa does not appear to discuss or suggest any aspect or feature of azimuthal variance or tilt angle variance within a **single** compensator film/layer recited in claims 8 and 13.

Claims 8 and 12 recite a compensator structure having a plurality of layers wherein a **single** layer within the compensator structure has an optic axis (azimuthal twist, tilt angle, or both) that varies. This feature is not described, discussed, or suggested in either of Arakawa or Heynderickx et al. The Court of Appeals for the Federal Circuit has held time and again that "[o]bviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." *In re Bond*, 910 F.2d at 834, 15 U.S.P.Q.2d at 1568, *quoting Carella v. Starlight Archery and Pro Line Co.*, 804 F.2d 135, 140, 231 U.S.P.Q. (BNA) 644, 647 (Fed. Cir. 1986) (affirming holding of nonobviousness); *see also, e.g., In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d (BNA) 1071, 1073 (Fed. Cir. 1987) (reversing Board holding of obviousness); *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. (BNA) 929, 933 (Fed. Cir. 1987) (reversing district court holding of obviousness).

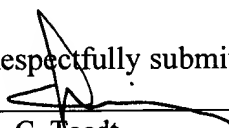
In light of the above amendments, remarks, and established case law, the Assignee submits that the alleged section 103 rejections have been overcome and respectfully requests these rejections be withdrawn.

CONCLUSION

Reconsideration and allowance of the pending claims is respectfully requested.

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Respectfully submitted,



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